

**AMENDMENTS TO THE CLAIMS**

1    1.-15. (Canceled)

1    16. (Currently Amended) A method for routing or switching data packets, comprising the  
2       computer-implemented steps of:  
3       receiving a data packet at an input interface on a router or switch;  
4       looking up information in the header of said data packet in an expanded M-trie data  
5       structure, wherein said expanded M-trie data structure is organized as a  
6       multi-level tree including a root node, inferior nodes, and terminal nodes,  
7       wherein each node stores values for an address and an opcode, wherein said  
8       opcode specifies:  
9       a particular field of a plurality of fields in the header of said data packet; and  
10      an operation that is to be performed on the data stored in said particular field,  
11      wherein said operation is one of a plurality of operations that said  
12      opcode can specify; and  
13      terminating said step of looking up information.

1    17. (Canceled)

1    18. (Canceled)

1    19. (Previously Presented) A method as in claim 16, wherein said address includes the  
2       address of a node in said expanded M-trie data structure that is to be traversed.

1    20. (Original) A method as in claim 16, wherein said expanded M-trie data structure  
2       includes a set of access control parameters.

- 1 21. (Previously Presented) A method as in claim 16, wherein said expanded M-trie data
- 2 structure includes a set of Quality of Service (QoS) parameters.
  
- 1 22. (Previously Presented) A method as in claim 16, wherein said expanded M-trie data
- 2 structure includes a set of Class of Service (CoS) parameters.
  
- 1 23. (Previously Presented) A method as in claim 16, wherein said nodes include opcodes for
- 2 demultiplexing, opcodes for matching, and opcodes for hashing.
  
- 1 24. (Previously Presented) A method as in claim 23, wherein said opcodes for
- 2 demultiplexing include instructions to demultiplex into branches of said expanded
- 3 M-trie data structure based on contents of a byte of said packet header that is being
- 4 read.
  
- 1 25. (Previously Presented) A method as in claim 23, wherein said opcodes for matching
- 2 include instructions to compare the contents of a given byte of the flow label to given
- 3 node data.
  
- 1 26. (Previously Presented) A method as in claim 23, wherein said opcodes for hashing
- 2 include instructions to hash into different M-trie plus branches based on the contents
- 3 of a given byte in said packet header.
  
- 1 27. (Canceled)
  
- 1 28. (Currently Amended) An apparatus for routing or switching data packets, comprising a
- 2 device that performs a method comprising:
- 3 storing in memory an M-trie data structure, said data structure organized as a multi-
- 4 level tree having a set of nodes, including a root node, inferior nodes and
- 5 terminal nodes, wherein each node stores values for an address and an
- 6 opcode, wherein said opcode specifies:

7           a particular field of a plurality of fields of data packet headers; and  
8           an operation that is to be performed on the data stored in said particular field,  
9                 wherein said operation is one of a plurality of operations that said  
10                 opcode can specify;  
11           receiving a data packet at an input interface on a router or switch, wherein the data  
12           packet includes information in at least a header with at least a field that is  
13           used by said M-trie data structure to indicate an action for said device to  
14           perform in order to select a leaf associated with said M-trie data structure;  
15           looking up the information, wherein the looking up includes performing the action;  
16           and  
17           routing said data packet at one or more output interfaces on said router or said  
18           switch.

1       29. (Currently Amended) A method for routing or switching data packets, comprising the  
2           computer-implemented steps of:  
3           storing in memory an M-trie data structure, said data structure organized as a multi-  
4           level tree having a set of nodes, including a root node, inferior nodes and  
5           terminal nodes, wherein each node stores values for an address and an  
6           opcode, wherein said opcode specifies:  
7           a particular field of a plurality of fields of data packet headers; and  
8           an operation that is to be performed on the data stored in said particular field,  
9                 wherein said operation is one of a plurality of operations that said  
10                 opcode can specify;  
11           receiving a data packet at an input interface on a router or switch, wherein the data  
12           packet includes information in at least a header with at least a field that is  
13           used by said M-trie data structure to indicate an action for a router to perform  
14           in order to select a leaf associated with said M-trie data structure; and  
15           looking up the information, wherein the looking up includes performing the action.

1       30. (Currently Amended) A memory storing a program for performing a method for routing  
2           or switching data packets, comprising:

3       storing in memory an M-trie data structure, said data structure organized as a multi-  
4       level tree having a set of nodes, including a root node, inferior nodes and  
5       terminal nodes, wherein each node stores values for an address and an  
6       opcode, wherein said opcode specifies:  
7              a particular field of a plurality of fields of data packet headers; and  
8              an operation that is to be performed on the data stored in said particular field,  
9                      wherein said operation is one of a plurality of operations that said  
10                      opcode can specify;  
11       receiving a data packet at an input interface on a router or switch, wherein the data  
12       packet includes information in at least a header with at least a field that is  
13       used by said M-trie data structure to indicate an action for a router to perform  
14       in order to select a leaf associated with said M-trie data structure;  
15       looking up the information, wherein the looking up includes performing the action;  
16              and  
17       routing said data packet at one or more output interfaces on said router or said  
18       switch.

1       31. (Canceled)

1       32. (Previously Presented) A memory as in claim 30, wherein said address includes an  
2       address of a node in said M-trie data structure that is to be traversed.

1       33. (Previously Presented) A memory as in claim 30, wherein said M-trie data structure  
2       includes a set of access control parameters.

1       34. (Previously Presented) A memory as in claim 30, wherein said M-trie data structure  
2       includes a set of Quality of Service (QoS) parameters.

1       35. (Previously Presented) A memory as in claim 30, wherein said expanded M-trie data  
2       structure includes a set of Class of Service (CoS) parameters.

- 1       36. (Previously Presented) A memory as in claim 30 wherein at least one of the root node,  
2                   inferior nodes, or the terminal node includes an opcode for demultiplexing, an  
3                   opcode for matching, and an opcode for hashing.
- 1       37. (Previously Presented) A memory as in claim 36 wherein said opcode for  
2                   demultiplexing includes instructions to demultiplex into branches of the M-trie data  
3                   structure based on contents of a byte of said packet header.
- 1       38. (Previously Presented) A memory as in claim 36, wherein said opcode for matching  
2                   includes instructions to compare the contents of a given byte of a flow label to given  
3                   node data.
- 1       39. (Previously Presented) A memory as in claim 36, wherein said opcode for hashing  
2                   includes instructions to hash into different branches the M-trie data structure based  
3                   on the contents of a given set of bytes in said packet header.
- 1       40. (Previously Presented) A method as recited in Claim 16, further comprising routing  
2                   said data packet at one or more output interfaces on said router or said switch.
- 1       41. (Previously Presented) A method as recited in Claim 16, further comprising  
2                   determining, based on one or more Access Control List (ACL) criteria stored in said  
3                   expanded M-trie data structure, whether to drop or forward said data packet.
- 1       42. (Previously Presented) A method as recited in Claim 41, wherein determining  
2                   whether to drop or forward said data packet comprises matching said information in  
3                   the header of said data packet to the one or more ACL criteria stored in said  
4                   expanded M-trie data structure.
- 1       43. (Previously Presented) A method as recited in Claim 41, wherein said one or more  
2                   ACL criteria include at least one of a source address, destination address, and upper-  
3                   layer protocol information.

- 1 44. (Previously Presented) A method as recited in Claim 41, wherein said one or more
- 2       ACL criteria are stored in a sub-tree of said expanded M-trie data structure.
  
- 1 45. (Previously Presented) A method as recited in Claim 29, further comprising routing
- 2       said data packet at one or more output interfaces on said router or said switch.
  
- 1 46. (Previously Presented) A method as recited in Claim 29, further comprising
- 2       determining, based on one or more Access Control List (ACL) criteria stored in said
- 3       M-trie data structure, whether to drop or forward said data packet.
  
- 1 47. (Previously Presented) A method as recited in Claim 46, wherein determining
- 2       whether to drop or forward said data packet comprises matching said information to
- 3       the one or more ACL criteria stored in said M-trie data structure.
  
- 1 48. (Previously Presented) A method as recited in Claim 46, wherein said one or more
- 2       ACL criteria include at least one of a source address, a destination address, and
- 3       upper-layer protocol information.
  
- 1 49. (Previously Presented) A method as recited in Claim 46, wherein said one or more
- 2       ACL criteria are stored in a sub-tree of said M-trie data structure.